

WHAT IS CLAIMED IS:

1. A negative electrode for lithium secondary battery,
said negative electrode being obtained by sintering a mixture
of an active material alloy and a binder arranged on a current
5 collector made of metallic foil, or sintering a mixture of an
active material alloy, conductive metal powder and a binder
arranged on a current collector made of metallic foil,

wherein said active material alloy after said sintering
process is substantially amorphous.

2. The negative electrode for lithium secondary battery
according to claim 1, wherein said active material alloy
contains Si.

3. The negative electrode for lithium secondary battery
according to claim 1, wherein said active material alloy
15 contains Al, Si and transition metal.

4. The negative electrode for lithium secondary battery
according to claim 1, wherein said sintering process is
performed by heat treatment in a non-oxidizing atmosphere at
a temperature lower than the crystallization temperature of
20 said active material alloy.

5. The negative electrode for lithium secondary battery
according to claim 1, wherein said metallic foil has a surface
roughness Ra of 0.2 μm or more.

6. The negative electrode for lithium secondary battery
25 according to claim 1, wherein said metallic foil is an

electrolytic copper foil or a metallic foil having an electrolytic copper layer on its surface.

7. The negative electrode for lithium secondary battery according to claim 1, wherein said conductive metal powder is copper or copper alloy powder.

8. A manufacturing method of a negative electrode for lithium secondary battery, comprising the steps of:

disposing a mixture of an active material alloy which is substantially amorphous and a binder, or a mixture of said active material alloy, conductive metal powder and a binder, on a current collector made of metallic foil; and

sintering said mixture under a condition such that said active material alloy is substantially amorphous after sintered.

9. The manufacturing method of a negative electrode for lithium secondary battery according to claim 8, wherein said sintering is performed by heat treatment in a non-oxidizing atmosphere at a temperature lower than the crystallization temperature of said active material alloy.

10. The manufacturing method of a negative electrode for lithium secondary battery according to claim 8, wherein said active material alloy, or said active material alloy and said conductive metal powder are mixed with a solution of said binder to obtain slurry, and the obtained slurry is applied onto said current collector and then dried, and thereby, said mixture is

disposed on the current collector.

11. The manufacturing method of a negative electrode for lithium secondary battery according to claim 10, wherein said mixture is rolled together with said current collector after
5 said application and drying process.

12. The manufacturing method of a negative electrode for lithium secondary battery according to claim 8, wherein said active material alloy contains Si.

10 13. The manufacturing method of a negative electrode for lithium secondary battery according to claim 8, wherein said active material alloy contains Al, Si and transition metal.

14. The manufacturing method of a negative electrode for lithium secondary battery according to claim 8, wherein said metallic foil has a surface roughness Ra of 0.2 μm or more.

15 15. The manufacturing method of a negative electrode for lithium secondary battery according to claim 8, wherein said metallic foil is an electrolytic copper foil or a metallic foil having an electrolytic copper layer on its surface.

20 16. The manufacturing method of a negative electrode for lithium secondary battery according to claim 8, wherein said conductive metal powder is copper or copper alloy powder.

17. A lithium secondary battery comprising; the negative electrode according to claim 1, a positive electrode and a non-aqueous electrolyte.

25 18. A lithium secondary battery comprising; the

negative electrode manufactured by the method according to
claim 8, a positive electrode and a non-aqueous electrolyte.

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